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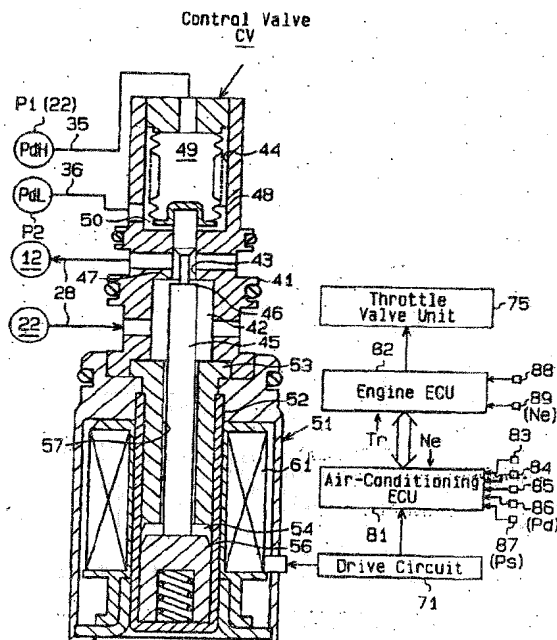
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(54) **Compressor torque computing method, air-conditioning system and engine control apparatus**

(57) An air conditioning apparatus includes a refrigerant circulation circuit that has a compressor. A driving status of the compressor is detected by first detector. A first calculator (81) calculates a theoretical torque and a driving efficiency of the compressor based on information from the first detector. A second calculator (82) calculates a necessary torque required for driving the compressor. The second calculator calculates the necessary torque based on the theoretical torque.

Fig.2**EP 1 243 449 A3**



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EUROPEAN SEARCH REPORT

Application Number
EP 02 00 6363

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 1 066 997 A (TOYODA AUTOMATIC LOOM WORKS ;DENSO CORP (JP)) 10 January 2001 (2001-01-10) * column 9, line 44 - column 13, line 51; figures 1-5 *	1,3,5-9	B60H1/32
A	US 5 924 296 A (KISHITA HIROSHI ET AL) 20 July 1999 (1999-07-20) * column 3, line 34 - column 5, line 6 * * column 7, line 38 - column 9, line 46; figures 1,2,6,14 *	1,3,5-9	
A	US 4 856 291 A (TAKAHASHI TADAHIRO) 15 August 1989 (1989-08-15) * column 3, line 22 - column 8, line 48; figures 1-11 *	1,3,5-9	
A	US 5 385 029 A (YAMANAKA YASUSHI ET AL) 31 January 1995 (1995-01-31) * column 8, line 22 - column 15, line 38; figures 1-5 *	1,3,6,8,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B60H F04B F25B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31 July 2003	Examiner Chlosta, P
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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ON EUROPEAN PATENT APPLICATION NO.**

EP 02 00 6363

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The members are as contained in the European Patent Office EDP file on
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31-07-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1066997	A	10-01-2001	JP 2001073941 A	21-03-2001
			BR 0002652 A	13-03-2001
			CN 1282860 A	07-02-2001
			EP 1066997 A2	10-01-2001
			US 6393849 B1	28-05-2002
US 5924296	A	20-07-1999	JP 3329275 B2	30-09-2002
			JP 11170858 A	29-06-1999
			DE 19841765 A1	08-04-1999
US 4856291	A	15-08-1989	JP 1175517 A	12-07-1989
			AU 2753488 A	29-06-1989
			DE 3843924 A1	13-07-1989
US 5385029	A	31-01-1995	JP 3092248 B2	25-09-2000
			JP 5099156 A	20-04-1993
			JP 3095086 B2	03-10-2000
			JP 5099157 A	20-04-1993
			JP 2995951 B2	27-12-1999
			JP 5096936 A	20-04-1993
			JP 2995952 B2	27-12-1999
			JP 5096937 A	20-04-1993
			JP 2988057 B2	06-12-1999
			JP 5096938 A	20-04-1993
			US 5285649 A	15-02-1994

EPO FORM P0459

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